REMARKS

Applicant expresses appreciation to the Examiner for consideration of the subject patent application and identification of allowable subject matter. This amendment is in response to the Office Action mailed December 17, 2003. Claims 1-8 were rejected. Claims 9-31 were previously withdrawn from consideration. Claim 1 has been further amended to address the concerns raised by the Examiner. Claims 1-8 were originally presented and remain in the application.

Claim Rejections - 35 U.S.C. § 103

Claims 1-8 (including independent claim 1) were rejected under 35 U.S.C. § 103 as being unpatentable over Chalamala et al (US Patent 6,091,190). In claim 1, as further amended, a Schottky diode is formed on the emitter electrode, comprising a Schottky metal layer formed on the emitter electrode and a semiconductor layer formed on the Schottky metal layer. As stated in the specification, page 6, beginning at line 16, this Schottky metal-semiconductor junction enhances the electron beam formation and transmission that originated at the emitter electrode.

As is well know, a Schottky junction creates an effect that lowers the potential barrier at the junction interface to effectively lower the work function. The current across the metal-semiconductor junction is enhanced by carrier diffusion, thermionic emission of carriers and quantum tunneling through the barrier. Thus, a Schottky junction creates an active interaction that lowers the barrier across the junction and reduces the effective work function.

In contrast, there is no interactive Schottky junction in the Chalamala patent. Rather, only a passivation layer 120 is formed over the emitter electrode 118 primarily for the purpose of protecting the electrode for oxidation. See column 3, lines 24-34. The passivation layer also has a work function lower than that of the emitter electrode. See column 3, lines 35-38. However, there is no interactive Schottky junction formed by a semi-conductor layer interacting with a metal layer that is formed on emitter electrode, as in the present invention.

The contrast between the present invention and the device in Chalamala is clearly shown by comparing Figure 6 of the present application to Figure 1 in Chalamala. In Figure 1 of Chalamala a single passivation layer 120 is formed on emitter electrode 118. In Figure 6 of the

present application, a metal layer 114 is formed on an emitter electrode 112, and a semi-conductor layer 116 is formed on the metal layer 114 to form the Schottky junction with the metal layer 114.

The Examiner proposes that the emitter electrode 118 and the passivation layer 120 form a Schottky junction. Applicant respectfully submits that the electrode 118 and the passivation layer do not form a Schottky junction. The electrode emitter is formed as a metal structure primarily for the purpose of emitting electrons, rather than as a thin metal layer interacting with a semi-conductor, as in a Schottky device. This is confirmed by the description in the Chalamala patent which makes no mention of a Schottky device or junction. Rather Chalamala describes the emitter as an emitter and the passivation layer as a protective layer to prevent the emitter electrode from oxidizing.

In any event, it is clear that Chalamala does not disclose or imply the formation of a metal layer on the emitter electrode which, together with a semi-conductor layer, form a Schottky junction. Accordingly, claim 1, as amended, clearly distinguishes from Chalamala in structure and in function.

Claims 2-8 are all directly or indirectly dependent on claim 1. Since claim 1 as amended is considered to be allowable, dependent claims 2-8 are also allowable.

According, Applicant respectfully submits that claims 1-8 are allowable, and urges the Examiner to withdraw the rejection.

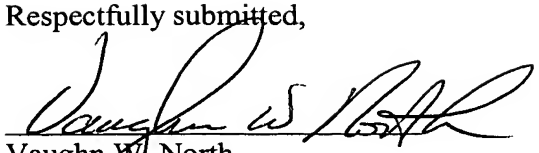
CONCLUSION

In light of the above, Applicant respectfully submits that pending claims 1-8 are now in condition for allowance. Therefore, Applicant requests that the final rejection be withdrawn, and that the claims be allowed and passed to issue. If any impediment to the allowance of these claims remains after entry of this Amendment, the Examiner is strongly encouraged to call Vaughn North at (801) 566-6633 so that such matters may be resolved as expeditiously as possible.

The Commissioner is hereby authorized to charge any additional fee or to credit any overpayment in connection with this Amendment to Deposit Account No. 08-2025.

DATED this 13th day of May, 2004.

Respectfully submitted,



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